* $f(0) = 0 \Rightarrow a = \frac{1}{5}\text{Ln}2$ d'où

$f(t) = -10\, e^{-\frac{1}{5}\text{Ln}2\,(t-5)} + 20$

$f(t) = -20\, e^{-\frac{t}{5}\text{Ln}2} + 20$

2) * $q(10) = 20 - f(10) = 20e^{-2\,\text{Ln}2}$

$= \frac{20}{e^{\text{Ln}4}} = \frac{20}{4} = 5$

$q(10) = 5g$

* $q(30) = 20 - f(30) = \frac{20}{64} = 0{,}312g$

* $q(60) = 20 - f(60) = \frac{5}{2^{10}} = 0{,}004g$

EXERCICE 6 :

1) $\begin{cases} C'(t) = -0{,}25\, C(t) \\ C(0) = 5 \end{cases}$

C est une solution de l'équation différentielle : $y'(t) = -0{,}25\, y(t)$

et $C(0) = 5$

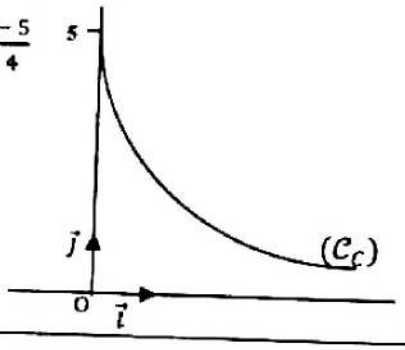
d'où : $C(t) = 5.e^{-0{,}25\,t}$

2)

$C(t) = 5\, e^{\frac{-t}{4}}$ alors $C'(t) = \frac{-5}{4} e^{\frac{-t}{4}} < 0$

x	0	$+\infty$
$C'(x)$	-	
$C(x)$	5 ↘	0

$C'(0) = \frac{-5}{4}$



3) $C(t) < 1 \Leftrightarrow e^{\frac{-t}{4}} < \frac{1}{5} \Leftrightarrow \frac{-t}{4} < -\text{Ln}5$

$\Leftrightarrow t > 4\text{Ln}5$

A la calculatrice $\ldots \leq t \leq \ldots$

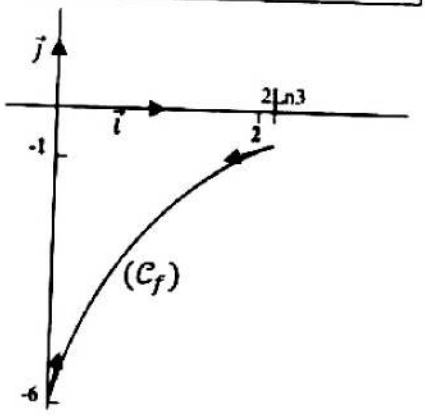
EXERCICE 7 :

1) $y' = -y$ et $f(\text{Ln}3) = -2$

$f(x) = -2\, e^{-(x-\text{Ln}3)} = -6\, e^{-x}$

2) $f'(x) = 6\, e^{-x}$

x	0	$2\text{Ln}3$
$f'(x)$	+	
$f(x)$	-6 ↗	$-\frac{2}{3}$



EXERCICE 8 :

1) $U(x) = 2$; $U'(x) = 0$

$U'(x) + 2\, U(x) = 4 = (U(x))^2$

D'où U est une solution de l'équation différentielle : $y' + 2y = y^2$

2) – a) $U \in (E)$ d'où $E \neq \phi$

b) $f \in (E) \Leftrightarrow f'(x) + 2\, f(x) = f^2(x)$

$\Leftrightarrow \frac{f'(x)}{f^2(x)} + \frac{2}{f(x)} = 1$

$\Leftrightarrow -(\frac{1}{f})'(x) + 2(\frac{1}{f})(x) = 1$